UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,587	06/30/2003	Toru Izumiyama	9281-4573	5240

7590 03/23/2006

Brinks Hofer Gilson & Lione
P.O. Box 10395
Chicago, IL 60610

EXAMINER	
LU, ZHIYU	

ART UNIT	PAPER NUMBER
2618	

DATE MAILED: 03/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/611,587	IZUMIYAMA, TORU	
	Examiner	Art Unit	
	Zhiyu Lu	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 June 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 23 are objected to because of the following informalities:

On line 23 of page 27 in claim 23, replace "signals" with ~signal~ to correct plural error.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3-4, 6-8, 10, 12-13, 15, 17-21, and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katou et al. (JP08-191256).

Regarding claim 1, Katou et al. teach a transmission-and-receiving switching circuit comprising:

a signal input-and-output end (P3 of Fig. 2) to which an antenna is connected (paragraph 0042);

a transmission circuit connected to the signal input-and-output end (P2 of Fig. 2) through a first switching diode (D3 of Fig. 2), the transmission circuit configured to output a transmission signal (paragraph 0042);

a receiving circuit connected to the signal input-and-output end (P1 of Fig. 2) through a second switching diode (D1 of Fig. 2), the receiving circuit configured to receive a receiving signal (paragraph 0042);

inductor elements (2c-2d of Fig. 2) for feeding bias voltages to the first switching diode and the second switching diode, wherein in the first switching diode and the second switching diode are switched to operating states opposite to each other by the bias voltages, the operating states being on and off; and

a first resonant circuit contains a first capacitor element (3b of Fig. 2) coupled with the inductor element (2b of Fig. 2) for feeding the first switching diode (D3 of Fig. 2), the first resonant circuit at least series resonating between the first switching diode and ground (Fig. 4, paragraph 65).

Katou et al. do not expressly disclose the limitation of a series resonant frequency of the first resonant circuit is about equal to a frequency of a signal other than the transmission signal. However, Katou et al. disclose that a series resonant frequency of the first resonant circuit may be equal to a frequency of the transmission signal (paragraph 0036), which makes it capable of may not be the same as the transmission signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the transmission-and-receiving switching circuit of Katou et al. into having a resonant frequency different from the transmission signal, in order to fit application usage.

Regarding claim 10, Katou et al. teach a transmission-and-receiving switching circuit comprising:

a pair of signal input-and-output ends (P3-P4 of Fig. 2), an antenna connected to one of the pair of signal input-and-output ends (paragraph 0042);

a transmission circuit (P2 of Fig. 2) connected to the one (P3 of Fig. 2) of the pair of signal input-and-output ends through a first switching diode (D3 of Fig. 2) and to the other (P4 of Fig. 2) of the pair of signal input-and-output ends through a second switching diode (D4 of Fig. 2), the transmission circuit configured to output a transmission signal of a transmission frequency (paragraph 0042);

a receiving circuit (P1 of Fig. 2) connected to the one (P3 of Fig. 2) of the pair of signal input-and-output ends through a third switching diode (D1 of Fig. 2) and to the other (P4 of Fig. 2) of the pair of signal input-and-output ends through a forth switching diode (D2 of Fig. 2), the receiving circuit configured to receive a receiving signal of a receiving frequency (paragraph 0042);

an inductor element (2c/2d of Fig. 2) connected between each switching diode and each of a pair of voltage feeding points;

a first resonant circuit that contains a first capacitor element (3b of Fig. 2) connected between ground and a first of the inductor elements (2b of Fig. 2) and a second resonant circuit that contains a second capacitor element (3a of Fig. 2) connected between ground and a second of the inductor elements (2a of Fig. 2), wherein the first (D3 of Fig. 2) and fourth (D2 of Fig. 2) switching diodes operate in opposite operating states from the second (D1 of Fig. 2) and third (D4 of Fig. 2) switching diodes; and

Katou et al. do not expressly disclose the limitation of a series resonant frequency of the first resonant circuit is about equal to a frequency of a signal other than one of the receiving and transmission signals.

However, Katou et al. disclose that a series resonant frequency of the first resonant circuit may be equal to a frequency of one of the receiving and transmission signals (paragraph 0036), which makes it capable of may not be the same as one of the receiving and transmission signals. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the transmission-and-receiving switching circuit of Katou et al. into having a resonant frequency different from one of the receiving and transmission signals, in order to fit application usage.

Regarding claim 20, Katou et al. teach a method of receiving and transmitting signals, the method comprising:

transmitting a transmission signal (P2 of Fig. 2) to a signal input-and-output end (P3 of Fig. 2) through a first switching diode (D3 of Fig. 2);

receiving a receiving signal (P1 of Fig. 2) from the signal input-and-output end (P3 of Fig. 2) through a second switching diode (D1 of Fig. 2);

feeding bias voltage to the first switching diode and the second switching diode (paragraphs 0051-0052);

switching the first switching diode (D3 of Fig. 2) and the second switching diode (D1 of Fig. 2) to opposing operating states via the bias voltages (paragraphs 0051-0052); and

coupling a first series resonant circuit (2b, 3b of Fig. 2) between the first switching diode (D3 of Fig. 2) and ground.

Katou et al. do not expressly disclose the limitation of the first series resonant circuit having a first series resonant frequency about equal to a frequency of a signal other than the transmission signal.

However, Katou et al. disclose that a series resonant frequency of the first resonant circuit may be equal to a frequency of the transmission signal (paragraph 0036), which makes it capable of may not be the same as one of the transmission signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the transmission-and-receiving switching circuit of Katou et al. into having a resonant frequency different from one of the transmission signal, in order to fit application usage.

Regarding claim 3, Katou et al. teach the limitation of claim 1.

Katou et al. also teach the limitation of the first resonant circuit (2b and 3b of Fig. 2) is provided between ground and a connection point (D of Fig. 2) of the first switching diode (D3 of Fig. 2) and the transmission circuit (P2 of Fig. 2).

Regarding claim 4, Katou et al. teach the limitation of claim 1.

Katou et al. also teach the limitation of the first resonant circuit is formed of a series-parallel resonant circuit (Figs. 3, 4, or 5 with 2b and 3b of Fig. 2) and a parallel resonant frequency of the

series-parallel resonant circuit is about equal to a frequency of the transmission signal (paragraphs 0036, 0067).

Regarding claim 6, Katou et al. teach the limitation of claim 1.

Katou et al. also teach the limitation of further comprising a second resonant circuit comprising a second capacitor element (3a of Fig. 2) coupled with the inductor element (2a of Fig. 2) for feeding the second switching diode (D1 of Fig. 2) for at least series resonating between the second switching diode and ground.

Katou et al. do not expressly disclose the limitation of a series resonant frequency of the second resonant circuit is about equal to a frequency of a signal other than the receiving signal.

However, Katou et al. disclose that a series resonant frequency of the second resonant circuit may be equal to a frequency of the receiving signal (paragraph 0036), which makes it capable of may not be the same as the receiving signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the transmission-and-receiving switching circuit of Katou et al. into having a resonant frequency different from the receiving signal, in order to fit application usage.

Regarding claim 7, Katou et al. teach the limitation of claim 6.

Katou et al. also teach the limitation of the second resonant circuit is provided between ground and a connection point (A of Fig. 2) of the second switching diode (D1 of Fig. 2) and the receiving circuit (P1 of Fig. 2).

Regarding claim 8, Katou et al. teach the limitation of claim 6.

Katou et al. also teach the limitation of the second resonant circuit is formed of a series-parallel resonant circuit (Figs. 3, 4, or 5 with 2a and 3a of Fig. 2) and a parallel resonant frequency of the series-parallel resonant circuit is about equal to a frequency of the receiving signal (paragraphs 0036, 0067).

Regarding claim 12, Katou et al. teach the limitation of claim 10.

Katou et al. also teach the limitation of a first connection point (D pf Fig. 2) connects the first switching diode (D3 of Fig. 2), the second switching diodes (D4 of Fig. 2) and the transmission circuit (P2 of Fig. 2), and the first resonant circuit is provided between ground and the first connection point (D of Fig. 2).

Regarding claim 13, Katou et al. teach the limitation of claim 12.

Katou et al. also teach the limitation of a second connection point (A of Fig. 2) connects the third switching diode (D1 of Fig. 2), the fourth switching diode (D2 of Fig. 2) and the receiving circuit (P1 of Fig. 2), and the second resonant circuit (2b, 3b of Fig. 2) is provided between ground and the second connection point (A of Fig. 2).

Regarding claim 15, Katou et al. teach the limitation of claim 10.

Katou et al. also teach the limitation of a first connection point (A of Fig. 2) connects the third switching diode (D1 of Fig. 2), the fourth switching diode (D2 of Fig. 2) and the receiving circuit

(P1 of Fig. 2), and the first resonant circuit (2a, 3a of Fig. 2) is provided between ground and the first connection point (A of Fig. 2).

Regarding claim 17, Katou et al. teach the limitation of claim 12.

Katou et al. also teach the limitation of the first resonant circuit is formed of a series-parallel resonant circuit (Figs. 3, 4, or 5 with 2a and 3a of Fig. 2) and a parallel resonant frequency of the series-parallel resonant circuit is about equal to a frequency of the receiving signal (paragraphs 0036, 0067).

Regarding claim 18, Katou et al. teach the limitation of claim 15.

Katou et al. also teach the limitation of the first resonant circuit is formed of a series-parallel resonant circuit (Figs. 3, 4, or 5 with 2a and 3a of Fig. 2) and a parallel resonant frequency of the series-parallel resonant circuit is about equal to a frequency of the receiving signal (paragraphs 0036, 0067).

Regarding claim 19, Katou et al. teach the limitation of claim 13.

Katou et al. also teach the limitation of the first and second resonant circuits each comprise a series-parallel resonant circuit (Figs. 3, 4, or 5 with 2a and 3a of Fig. 2) with a parallel resonant frequency of about equal to the receiving frequency and the transmission frequency, respectively (paragraphs 0036, 0067).

Regarding claim 21, Katou et al. teach the limitation of claim 20.

Katou et al. also teach the limitation of further comprising forming the first series resonant circuit from an inductor (2b of Fig. 2) in series with a first capacitor (3b of Fig. 2), connecting the first capacitor to ground and the inductor to the first switching diode (D3 of Fig. 2).

Regarding claim 24, Katou et al. teach the limitation of claim 20.

Katou et al. also teach the limitation of further comprising coupling a second resonant circuit (2a, 3a of Fig. 2) between the second switching diode (D1 of Fig. 2) and ground.

Katou et al. do not expressly disclose the limitation of a second series resonant frequency of the second resonance frequency of about equal to a frequency of a signal other than the receiving signal.

However, Katou et al. disclose that a series resonant frequency of the second resonant circuit may be equal to a frequency of the receiving signal (paragraph 0036), which makes it capable of may not be the same as the receiving signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Katou et al. into having a resonant frequency different from the receiving signal, in order to fit application usage.

Regarding claim 25, Katou et al. teach the limitation of claim 24.

Katou et al. also teach the limitation of further comprising forming the second series resonant circuit from an inductor in series with a first capacitor, connecting the first capacitor (3a of Fig. 2) to ground and the inductor (2a of Fig. 2) to the second switching diode (D1 of Fig. 2).

3. Claims 5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katou et al. (JP08-191256) in view of Satoh et al. (US2002/0137471).

Regarding claim 5, Katou et al. teach the limitation of claim 1.

But, Katou et al. do not expressly disclose the limitation of the first capacitor element and the inductor element for feeding the first switching diode are formed of lumped-constant-type circuit components.

Satoh et al. teach the limitation of using lumped-constant-type circuit components instead of distributed constant components (paragraph 0043).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the transmission-and-receiving switching circuit of Katou et al. with lumped-constant-type circuit components taught by Satoh et al., so that the circuit components can be combined, simplified, and dimension reduced.

Regarding claim 9, Katou et al. teach the limitation of claim 6.

But, Katou et al. do not expressly disclose the limitation of the second capacitor element and the inductor element for feeding the second switching diode are formed of lumped-constant-type circuit components.

Satoh et al. teach the limitation of using lumped-constant-type circuit components instead of distributed constant components (paragraph 0043).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the transmission-and-receiving switching circuit of Katou et al. with

lumped-constant-type circuit components taught by Satoh et al., so that the circuit components can be combined, simplified, and dimension reduced.

4. Claims 2, 11, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katou et al. (JP08-191256) in view of Khanna (US Patent#4649354).

Regarding claim 2, Katou et al. teach the limitation of claim 1.

But, Katou et al. do not expressly disclose the limitation of the series resonant frequency is about equal to a frequency of a local oscillation signal in the transmission circuit.

Khanna teaches the limitation of the limitation of the resonant frequency is about equal to a frequency of a local oscillation signal in the switching circuit (column 1 lines 35-37, column 7 lines 30-39).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the resonant frequency in the transmission-and-receiving switching circuit of Katou et al. into a frequency equal to a local oscillation signal in the switching circuit taught by Khanna, in order to fit application usage.

Regarding claim 11, Katou et al. teach the limitation of claim 10.

But, Katou et al. do not expressly disclose the limitation of the series resonant frequency is about equal to a frequency of a local oscillation signal in one of the receiving and transmission circuits.

Khanna teaches the limitation of the limitation of the resonant frequency is about equal to a frequency of a local oscillation signal in the switching circuit (column 1 lines 35-37, column 7 lines 30-39).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the resonant frequency in the transmission-and-receiving switching circuit of Katou et al. into a frequency equal to a local oscillation signal in the switching circuit taught by Khanna, in order to fit application usage.

Regarding claim 23, Katou et al. teach the limitation of claim 20.

Katou et al. do not expressly disclose the limitation of further comprising reducing local oscillation signals when transmitting the transmission signal by providing that the first series resonant frequency is about equal to a frequency of the local oscillation signal.

Khanna teaches the limitation of the limitation of the resonant frequency is about equal to a frequency of a local oscillation signal in the switching circuit (column 1 lines 35-37, column 7 lines 30-39).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the resonant frequency in the method of Katou et al. into a frequency equal to a local oscillation signal in the switching circuit taught by Khanna, in order to fit application usage.

5. Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katou et al. (JP08-191256) in view of Brand et al. (US Patent#5901057).

Regarding claim 14, Katou et al. teach the limitation of claim 12.

Katou et al. also teach the limitation of a second connection point (F of Fig. 2) connects the first switching diode (D3 of Fig. 2), the third switching diode (D1 of Fig. 2) and a first of the pair of signal input-and-output ends (P3 of Fig. 20), and an inductor (2c of Fig. 2) connects with the second connection point.

But, Katou et al. do not expressly disclose the limitation of the second resonant circuit is provided between ground and the second connection point.

Brand et al. teach the limitation of connecting a shunt capacitor to a series inductor to form a resonant circuit to improve power factor correction and reduce harmonic distortion (column 1 lines 46-55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the transmission-and-receiving switching circuit of Katou et al. with connecting a shunt capacitor to a series inductor taught by Brand et al., in order to improve power factor correction and reduce harmonic distortion to fit application usage.

Regarding claim 16, Katou et al. teach the limitation of claim 15.

Katou et al. also teach the limitation of a second connection point (F of Fig. 2) connects the first switching diode (D3 of Fig. 2), the third switching diode (D1 of Fig. 2) and a first of the pair of signal input-and-output ends (P3 of Fig. 20), and an inductor (2c of Fig. 2) connects with the second connection point.

But, Katou et al. do not expressly disclose the limitation of the second resonant circuit is provided between ground and the second connection point.

Brand et al. teach the limitation of connecting a shunt capacitor to a series inductor to form a resonant circuit to improve power factor correction and reduce harmonic distortion (column 1 lines 46-55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the transmission-and-receiving switching circuit of Katou et al. with connecting a shunt capacitor to a series inductor taught by Brand et al., in order to improve power factor correction and reduce harmonic distortion to fit application usage.

6. Claims 22 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katou et al. (JP08-191256) in view of Newman, Jr. (US Patent#5224029).

Regarding claim 22, Katou et al. teach the limitation of claim 21.

But, Katou et al. do not expressly disclose the limitation of further comprising forming a parallel resonant circuit with the first series resonant circuit by connecting a second capacitor in parallel with the inductor, the parallel resonant circuit having a frequency of about equal to a frequency of the transmission signal.

Newman, Jr. teach the limitation of forming a parallel resonant circuit with the first series resonant circuit by connecting a second capacitor in parallel with the inductor (column 2 lines 22-38).

Katou et al. also disclose that the resonant frequency of the first resonant circuit may be equal to a frequency of the transmission signal (paragraph 0036).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate parallel resonant circuit into the method of Katou et al., in order to reduce harmonic distortion and fit application usage.

Regarding claim 26, Katou et al. teach the limitation of claim 21.

But, Katou et al. do not expressly disclose the limitation of further comprising forming a parallel resonant circuit with the second series resonant circuit by connecting a second capacitor in parallel with the inductor, the parallel resonant circuit having a frequency of about equal to a frequency of the transmission signal.

Newman, Jr. teach the limitation of forming a parallel resonant circuit with the first series resonant circuit by connecting a second capacitor in parallel with the inductor (column 2 lines 22-38).

Katou et al. also disclose that the resonant frequency of the second resonant circuit may be equal to a frequency of the transmission signal (paragraph 0036).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate parallel resonant circuit into the method of Katou et al., in order to reduce harmonic distortion and fit application usage.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zhiyu Lu whose telephone number is (571) 272-2837. The examiner can normally be reached on Weekdays: 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on (571)272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Zhiyu Lu ZL
March 3, 2006

EDAN ORGAD
PATENT EXAMINER/TELECOMM.
3/26/06